

Contrasting Adult Literacy Learners With and Without Specific Learning Disabilities

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### Abstract

Contrasting adult literacy learners with and without specific learning disabilities  
This study of 311 adult education (AE) learners found 29% self-reported having a specific learning disability (SLD). Significant differences in demographic, academic, and life experience variables between the adult learners with and without SLD included: prior participation in special education, having both an SLD diagnosis and a high school diploma, low reading scores, middle age, and negative perceptions about limitations due to reading abilities. A post-hoc regression analysis found SLD status significantly contributes to variance in reading level when controlling for age and IQ. From these findings we conclude that SLD status should be considered an educationally relevant variable in adult education that warrants a diagnostic or clinical teaching approach.

Key Words: adult education, literacy, learning disability

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About two-thirds of students who drop out of high school earn a diploma or an alternative credential within eight years of the date they would normally have graduated (Berkold, Geis, & Kaufman, 1998; Hurst, Kelly, & Princiotta, 2004). In fact, annually more than 1.4 million of these individuals make personal investments for further education. They earn a GED credential or improve literacy skills through adult education (AE) programs funded by the *Adult Education Family Literacy Act* ([*AEFLA*], Title II of P.L.105-220) as a means to higher education, improved employment opportunities, or increased satisfaction with their quality of life (D'Amico, 2003, National Center for Education Statistics [NCES], 2006). Adults with specific learning disabilities (SLD) tend to be overrepresented among this population (Kruidenier, 2002; Moore & Stavrianos, 1995; Nightingale, Yudd, Anderson, & Barnow, 1991) and display unique characteristics (Scanlon & Mellard, 2002) that are not well documented or researched. Therefore, this paper will describe a sample of 311 adult education learners and examine the differences between those with and without SLD.

Addressing the academic needs of educationally limited individuals is important to national productivity as well as to the individuals and their families (D'Amico, 2003; Kutner, Greenberg, & Baer, 2005). Adults with low literacy skills or without a high school diploma/GED are more likely to experience unemployment, live in poverty, or receive government assistance than those with higher literacy and/or a high school credential (Childtrendsdatabase, 2007; Kutner et al., 2007). These negative social and economic outcomes of educational limitations are even greater for adults with SLD compared to other individuals with similar education and literacy levels (Reder, 1995). One reason for this differential impact may be that young adults with SLD attend colleges or universities, and complete vocational and non-college postsecondary education programs at lower rates than their non-disabled peers (Murray, Goldstein, Nourse, & Edgar, 2000). Thus Goldstein, Murray, and Edgar's (1998) 10-year study of adults with SLD found they had less earning power than non-disabled peers; likewise, the National Assessment of Adult Literacy found adults with below basic literacy skills were more likely to work in low-paying service industry occupations and have lower household incomes than people with higher literacy skills (Kutner et al., 2007).

In order to improve literacy skills, employability, and readiness for postsecondary education for individuals who did not complete high school or completed without attaining basic reading, writing or math skills, the federal government provides funding and oversight to state and local adult education programs. In *A blueprint: Preparing for America's future*, the U.S. Department of Education affirmed this population "deserve[s] a broad array of high-quality program options that best meet their needs" (D'Amico, 2003, p. 2). The National Reporting System (NRS; U.S. Department of Education [USDE], 2006) for adult education programs makes distinctions between learner needs based on educational functional levels (exclusive of English language learners), and does not make distinctions for SLD status.

Functional literacy, that is, a measure of a learner's ability to perform literacy tasks similar to those encountered in real life, is the basis for instructional placement in most AE program instruction. NRS has six educational functional levels for categorizing adult learners, which are programmatically divided into four levels of basic skills instruction (Adult Basic

Education or ABE) and two groups of high school level instruction for learners pursuing a GED (Adult Secondary Education or ASE).

ABE learners' skills range from no or minimal reading skills to reading simple descriptions and narratives on familiar subjects or from which new vocabulary can be determined by context (USDE, 2006). Beginning ABE Literacy (Level 1) learners are functionally limited to little or no ability to read basic signs or maps, or provide personal information on forms. Beginning ABE learners (Level 2) have functional abilities that include reading simple directions, signs, and maps, and filling out simple forms requiring basic personal information. Low Intermediate ABE (Level 3) learners function with basic literacy tasks related to life roles, such as completing medical forms, and reading simple charts, graphs, labels, payroll stubs, and authentic material on a familiar topic. High Intermediate ABE (Level 4) learners have the added functional skills that allow them to follow multi-step diagrams and read procedural texts supported by a diagram in order to remedy a problem.

ASE learners can, at the very least, comprehend expository text, identify the main idea in reading selections, and use a variety of context issues to determine meaning (USDE, 2006). Low ASE (Level 5) learners are expected to function as well as Level 4 learners with such additional capabilities as reading common legal forms and manuals, and integrating information from texts, charts, and graphs. High ASE (Level 6) learners should also be able to read technical information and complex manuals, some college level books, and apprenticeship manuals.

A widely used instructional model in AE is individualized group instruction, in which students gather in a group with a teacher but work independently on individualized assignments while the teacher assigns work, corrects students work, keeps records, and assists students as necessary (Beder & Medina, 2001; Robinson-Geller, 2007). This practice is based on such adult learning theories as andragogy, transformational learning, and self-directed learning (Baumgartner, Lee, Birden, & Flowers, 2003; Boyd, 1989; Daloz, 1999; Freire, 2000; Knowles, 1980; Merriam & Caffarella, 1999; Mezirow, 2000), in which adults take responsibility for and direct their own learning experiences. Recent observations and surveys of AE classroom activities found that learners worked alone or with computers over one-third of the time they were in the classroom (Mellard, Scanlon, Kissam, & Woods, 2005; Smith & Hofer, 2003).

In contrast to the AE practice of differentiating instruction based on functional literacy levels, adult literacy research recommends differentiating learners and instruction on the basis of reading component skills and deficits (Curtis & Kruidenier, 2005; McShane, 2005; Strucker & Davidson, 2003). The recommendation, perhaps, is a pragmatic response to Fowler and Scarborough's (1993) assertion that "the multiple factors associated with literacy problems are nearly impossible to disentangle" (p. 71), and in most instances the origin of reading difficulties (such as SLD) do not aid in making instructional decisions. Rather, the National Institute for Literacy's Partnership for Reading summary of scientifically based research recommends organizing adult reading instruction around learner skills and deficits in alphabetics, fluency, vocabulary, and comprehension (Curtis & Kruidenier, 2005). Likewise, the National Center for the Study of Adult Learning and Literacy clustered AE learners on the basis of phonological awareness, rapid naming, word recognition, oral reading, spelling, vocabulary, and background knowledge (Strucker & Davidson, 2003).

However, neither approach to instructional placement, that is functional literacy levels or reading component skills and deficits, account for differences in learners' cognitive processes, which may dictate the need for such alternative instructional methods as those used in K-12 remedial and special education. In fact, many AE learners are the very same people who researchers in the K-12 setting labeled as either learning disabled or at-risk of school failure. In recognition of this fact, the Partnership for Reading recommends that when planning instruction adult educators should consider SLD an important learner characteristic for planning instruction (Kruidenier, 2002). Yet, very little empirical data exists describing the differences between adult learners with SLD and their non-SLD peers in AE.

In order to advance AE policy, practice, and research in addressing the unique instructional needs of adult learners with SLD within the "broad array of high-quality program options" we offer the following: (a) description of 311 adult education learners, (b) an analysis of how AE participants with self-reported SLD ( $n = 89$ ) differ on key demographic, academic, and life experience characteristics from those AE participants not reporting an SLD ( $n = 222$ ), and (c) an analysis of the degree to which variance in reading level is explained by differences in SLD status. We discuss the implications of our findings on instructional interventions in adult education settings and provide two individual student profiles to illustrate our key findings.

## Methods

### *Research Design*

This study describes participants from a broader study of adult education participants, that is, learners receiving adult literacy and GED preparation services. To identify significant differences between adult learners with and without SLD we employed univariate and bivariate analyses of 32 demographic, academic, and life experience variables cited in the literature as important factors in adult literacy (e.g., Corely & Taymans, 2002; Vogel, & Holt, 2003). To give us insight into the reading skill and ability of this population and how those scores differ by self-reported SLD status, we performed data analyses on three dependent variables: reading comprehension, functional reading ability, and general intelligence. We next performed a post-hoc sequential regression analysis to test the influence of the SLD condition on functional reading level after controlling for age and general intellectual ability.

### *Setting and Subjects*

During a 30-month period, research staff collected data from adults enrolled in 13 Midwestern *Adult Education and Family Literacy Act* programs (exclusive of English as a Second Language services). Subjects had to be at least 16 years old; to have withdrawn from secondary education without earning a secondary credential or without attaining basic reading, writing or math skills; have U.S. citizenship or authorization to work in the U.S. as a foreign national in order to receive a nominal participation payment; and to have volunteered to participate in our study. Trained graduate research assistants assessed participants individually at the AE sites.

*Sampling method.* From approximately 713 learners who volunteered for the study, we drew a stratified sample based on the six NRS educational functional levels (USDE, 2001) using Comprehensive Adult Student Assessment System (CASAS, 2001) reading diagnostic scores. At each study site we randomly selected a sample of NRS Levels 4, 5, and 6, for a total of approximately 60 learners per level. Due to too few Levels 1, 2, and 3 volunteers, we used a convenience sample that included eligible volunteers up to a total of 60 per level. Through these two selection processes we started with 568 subjects; 237 subjects were no longer available for the study or declined to participate when contacted. We eliminated 14 participants' data about which we had validity concerns (e.g., statistical outliers, cognitive disability such as traumatic brain injury), and 6 participants' data because of incomplete assessments. Therefore, we present analyses on a sample of 311 adult education participants distributed by NRS levels as follows: Level 1  $n = 29$ ; Level 2  $n = 44$ ; Level 3  $n = 59$ ; Level 4  $n = 60$ ; Level 5  $n = 58$ ; Level 6  $n = 61$ .

Of these 311 participants, 89 (29%) reported having one or more SLD, 216 (69%) reported no SLD, six (2%) did not know. The sample was 59% female ( $n = 184$ ), which is typical among AE populations (Moore & Stavrianos, 1995). Participants tended to be young; although the mean age was 31 years ( $SD = 15$ ), the median age was 25 years. Thirty-eight percent of participants ( $n = 119$ ) were White, non-Hispanic, and 35% ( $n = 109$ ) were African American. Ten percent of participants ( $n = 31$ ) spoke Spanish while growing up, and 12% ( $n = 36$ ) spoke languages other than English or Spanish. Two-thirds of the participants (67%,  $n = 208$ ) lived in an urban area.

Most participants (72%,  $n = 224$ ) had been employed in the previous year. On average their household income was estimated by self-report at \$19,000, close to the federal poverty level for a family of four (U.S. Department of Health and Human Services, 2005). The household income group with the highest number of participants ( $n = 45$ ) earned no more than \$5,000 annually, placing their income below the federal poverty level of \$9,750 for an individual. About half of the participants had never been married.

Most participants (78%,  $n = 242$ ) had no secondary education credential, but 22% of participants ( $n = 69$ ) reported they had earned a secondary credential. These individuals participated in adult education to improve their literacy skills for a variety of reasons such as improving their employment prospects, preparing for higher education, or to better help children with homework.

### *Instruments*

For these analyses we used results from four assessments: (a) a structured interview using a background questionnaire to collect demographic characteristics, education, health, and occupational statuses, and family history; (b) a standardized measure of reading comprehension performance; (c) a measure of functional literacy; and (d) a measure of general intelligence. The background questionnaire is available from the senior author by request.

As a summary measure of reading comprehension skills we selected the 1998 edition Woodcock Reading Mastery Test-Revised passage comprehension subtest (WRMT-R PC; Woodcock, 1998). This standardized assessment is widely used to measure ability to read and

comprehend short passages of two to three sentences using a cloze procedure for 68 items arranged in order of difficulty.

We elected to include a second measure of reading ability, the Comprehensive Adult Student Assessment System Reading assessment (CASAS, 2001), because it assesses adult functional literacy (i.e., competencies related to workplace and survival needs, such as reading technical manuals, tax forms, prescription labels) with validity and strong psychometric properties (Flowerday, 2005). Furthermore, CASAS is broadly used in the AE community as well as in human service and labor agencies (National Institute for Literacy, 2004). We classified participants' CASAS Reading scores into the six NRS reading levels (USDE, 2001) using the Kansas AE programs' equivalency scale (e.g., Level 1  $\leq$  200; Level 2 = 201–210; Level 3 = 211–220; Level 4 = 221–235; Level 5 = 236–245; and Level 6  $\geq$  246).

As a measure of general intellectual ability we chose a composite score developed from three Wechsler Adult Intelligences Scale III subtests (WAIS; Wechsler, 1997) that do not require examinees to read, thereby not confounding the measure of general intelligence with low reading ability. The WAIS Block Design subtest measures general intelligence by requiring replication of two-color designs starting with two-block designs and progressing in difficulty to nine-block designs. The WAIS Information subtest assesses general knowledge through a series of oral questions and answers. The WAIS Vocabulary subtest measures word knowledge by requiring oral definitions of orally presented words. We calculated a composite variable—WAIS pro-rated IQ—from these subtests using the procedures specified in Sattler (2001).

### *Variables*

Research staff checked variables to ensure they met assumptions of normal distribution, central tendency, and multicollinearity, and plotted all variables with another relevant variable in scatter plots for visual inspection following Tabachnick and Fidell's (2007) recommended data cleaning procedures. Figure 1 lists the dichotomous categorical variables we dummy coded one for our analyses and the levels we used for categorical variables.

*Figure 1*  
Variable dummy codes and categories

Dichotomous Variables	Dummy code = 1
Gender	Female
Ethnic group	Non-white
Reading difficulty status	Had trouble reading as a child
Remedial help status	Received help or had special classes
Marital status	Never married
Urban status	Urban
Employment status	Employed
Perceived limitations to job opportunities because of reading, writing, math or computer skills (each)	Yes
Visited primary care providers, emergency rooms, or dentists; treatment for substance abuse (each)	Yes
Vision or hearing difficulties, other impairments or disabilities (each)	Yes



Emotional support	Had someone in whom participant could confide
Categorical Variables	Levels
National Reporting System [NRS] reading level	6 levels: Beginning Basic Education; Low Intermediate Adult Basic Education; High Intermediate Adult Basic Education; Low Adult Secondary Education; High Adult Secondary Education
Household income	5 levels: No income; \$1-\$9,999.00; \$10,000-\$19,999; \$20,000-\$39,999; > \$40,000
Age	4 levels: 16-25 years; 26-35 years; 36-45 years; 46-55 years*
Education level completed before entering adult education	5 levels: up to 8th grade; 9th grade; 10th grade; 11th grade; 12th grade or further studies
Mother's educational level	3 levels: Some grade or high school; GED or high school diploma received; Further studies after high school or GED
Number of employers	3 levels: 1; 2; 3 or more
Weekly hours worked	4 levels: 0; 1 to 20; 21 to 40; 41 or more
Overall health rating	5 levels: Poor; Fair; Good; Very good; Excellent
Life satisfaction rating	5 levels: Extremely unsatisfied; Unsatisfied; Neither satisfied nor dissatisfied; Satisfied; Extremely satisfied
Sadness rating (feeling downhearted or blue in the last four weeks)	5 levels: None of the time; A little of the time; Some of the time; A good bit of the time; Almost all of the time

Note: \*Participants over 55 were excluded from analysis due to insufficient data for accurate analysis.

### *Data Analysis*

In order to compare and contrast subjects with and without SLD, we calculated and compared mean scores on WRMT-R PC, CASAS Reading, and WAIS pro-rated IQ for groups differing in self-reported SLD, and calculated Glass' delta as a measure of effect size for significant group differences. Next, we cross-tabulated dichotomous and ordinal variables with self-reported SLD status. For dichotomous variables we used  $\chi^2$  to test independence of each NRS level when cross-tabulated with SLD status and with odds ratio as a measure of strength of the association (Agresti, 1996). For ordinal variables, we employed a Mantel-Haenzel chi-squared statistic,  $M^2$ , to assess the degree of linear associations, with  $r$ , a Pearson correlation of the ordinal variable's ranked score with the SLD group status, estimating the strength of the association (Agresti, 1996). The  $r$  value is calculated from  $M^2$ , which equals  $(n-1)r^2$ . We opted for the Mantel-Haenzel chi-squared statistic because it relies on a single degree of freedom to test statistical dependency, regardless of number of ordinal levels, and therefore has greater power than  $\chi^2$ , which uses multiple degrees of freedom. We reported the Mann-Whitney statistic,  $U$  to test whether ordinal differences in scores are significant between self-reported SLD and non-SLD (Agresti, 1996; Grissom & Kim, 2005).

Lastly, we performed a post-hoc sequential regression analysis to test whether SLD status contributes further prediction to CASAS Reading raw scores after controlling for IQ and age. To meet assumptions of the regression analysis (Tabachnick & Fidell, 2007), both IQ and age were transformed through an inverse calculation to correct for extreme positive skew (i.e., generally low IQ scores and generally young participants). For the dummy-coded SLD status variable, the group coded one represented participants with SLD.

## Results

Data presented in Table 1 reflect significant differences in reading comprehension, functional reading, and general intelligence of participants with SLD and without SLD. Significant differences between the SLD and non-SLD groups are demonstrated for 12 of 32 demographic, academic, and life experience variables for which data are presented in Table 2 (dichotomous categorical variables) and Table 3 (ordinal categorical variables). Results are organized here by demographic, academic, and life experience domains.

Table 1

*Differences in Reading Ability and IQ by Self-reported Specific Learning Disability Status*

Characteristic	n	M	SD	t	df	$\Delta$
WRMT-R Passage Comprehension raw score						
All Examinees	293	37.81	13.53			
Self-reported SLD				4.47**	291	.54
Yes	84	32.40	13.95			
No	209	39.98	12.76			
CASAS Reading raw score						
All Examinees	288	18.86	7.74			
Self-reported SLD				5.12**	177.49	.69
Yes	85	15.55	6.80			
No	203	20.24	7.71			
WAIS pro-rated IQ						
All Examinees	297	81.93	12.36			
Self-reported SLD				2.32*	295	.27
Yes	88	79.39	13.32			
No	209	83.00	11.81			

\*  $p < .05$  \*\*  $p < .001$ *Demographic*

Participants in both the SLD and non-SLD groups were demographically similar. Participants with SLD were almost as likely to be male (48%) as female (52%), and, although 63% of those not reporting SLD were female, gender differences were not statistically significant. Both groups had an average age of 31 years with about half of participants from each group between 16 and 25 years old. However, with ages organized into four 10-year intervals from 16 to 55 years (excluding participants above 55 years, of which too few reported SLD for accurate analysis), participants reporting SLD tended to be significantly more middle aged (46 to 55 years old) than participants without SLD,  $M^2(1, 276) = 4.50$ ,  $U = 7,057.00$ ,  $p < .05$ ,  $r = .13$ . No significant difference existed between racial and ethnic groups in the incidence of SLD.

*Academic*

For participants with SLD, the mean WRMT-R PC raw score was 32.4 ( $n = 84$ ,  $SD = 14.0$ ) in contrast to the mean score for participants not reporting SLD of 40.0 ( $n = 209$ ,  $SD =$

12.8), a significant difference,  $t(291) = 4.5$ ,  $p < .001$ ,  $\Delta = .54$ . To help with understanding the difference in these scores, we used the WRMT-R normative values to convert the scores into a grade equivalent score. When the raw scores are converted to a grade equivalent index, the mean reading level of participants with SLD was 3rd grade equivalent, and for participants without SLD reading comprehension was 5th grade equivalent.

Table 2

*Differences in Adult Education Learners' Learning Disabilities Status (Dichotomous Variables)*

Dichotomous categorical variables	<i>df</i>	<i>n</i>	$\chi^2$	<i>p</i>	Odds ratio
Demographic					
Female	1	305	3.06	.08	--
Non-White ethnic group	1	303	2.45	.12	--
Academic					
Had trouble reading as a child	1	291	35.45	<.001	6.07
Received help or had special classes	1	302	65.90	<.001	9.11
Life experiences					
Never married	1	305	3.00	.08	--
Urban	1	305	0.88	.35	--
Employed	1	305	0.97	.33	--
Perceived limitations to job opportunities because of reading skills	1	299	17.75	<.001	2.96
Perceived limitations to job opportunities because of writing skills	1	301	11.84	.001	2.42
Perceived limitations to job opportunities because of math skills	1	302	1.68	.19	--
Perceived limitations to job opportunities because of computer skills	1	301	2.32	.13	--
Visited primary care providers	1	305	3.17	.08	--
Visited emergency rooms	1	305	1.53	.22	--
Visited dentists	1	305	0.15	.70	--
Had treatment for substance abuse	1	305	1.61	.20	--
Had vision difficulties	1	304	7.97	<.01	2.21
Had hearing difficulties	1	304	0.71	.40	--
Had other impairments or disabilities	1	305	1.71	.19	--
Had someone in whom to confide	1	304	0.12	.73	--

The mean CASAS Reading raw score for the SLD group was 15.6 ( $n = 85$ ,  $SD = 6.8$ ), which converts to a standard score of 226, compared to 20.2 ( $n = 203$ ,  $SD = 7.7$ ) for the non-SLD group, or a standard score of 230. These values would place the average participant at NRS Level 4. Mean score differences on CASAS were statistically and practically significant,  $t(177) = 5.1$ ,  $p < .001$ ,  $\Delta = .69$  (Table 1).

The average WAIS pro-rated IQ score for participants with SLD was 79.4 ( $n = 88$ ,  $SD = 13.3$ ). For participants not reporting SLD, the mean IQ score was 83.0 ( $n = 209$ ,  $SD = 11.8$ ), which was significantly higher for participants without SLD,  $t(295) = 2.3$ ,  $p < .05$ ,  $\Delta = .27$ .

Participants with SLD tended to enter AE programs with significantly lower NRS reading levels than participants without SLD,  $M^2(1, 305) = 29.1$ ,  $U = 5857.5$ ,  $p < .001$ ,  $r = .31$ . For participants reporting SLD the average entry level was one full level lower ( $n = 89$ ,  $M = 3.1$ ,  $SD = 1.5$ ) than for participants not reporting SLD ( $n = 216$ ,  $M = 4.2$ ,  $SD = 1.6$ ). The Level 3 average entry for those with SLD is roughly equivalent to a 6th-grade reading skill, and the Level 4 for those not reporting SLD is equivalent to an 8th-grade reading skill.

Table 3

*Differences in Adult Education Learners' Learning Disabilities Status (Ordinal Variables)*

Ordinal categorical variables	<i>df</i>	<i>n</i>	$M^2$	<i>U</i>	<i>p</i>	<i>r</i>
Demographic						
Age group (4 levels, ages 16 to 55 years)	1	276	4.50	7,057.00	<.05	.13
Academic						
National Reporting System reading level (6 levels)	1	305	29.12	5,857.50	<.001	.31
Education level completed before entering AE (5 levels)	1	304	8.59	7,591.50	<.01	.17
Mother's educational level (3 levels)	1	265	0.74	6,717.00	>.05	--
Life experience						
Household income (5 levels)	1	257	0.53	6,000.00	>.05	--
Number of employers (3 levels)	1	221	1.67	4,493.00	>.05	--
Weekly hours worked (4 levels)	1	305	0.42	9,129.00	>.05	--
Overall health rating (5 levels)	1	305	1.15	8,917.50	>.05	--
Life satisfaction rating (5 levels)	1	305	4.60	8,302.00	<.05	.12
Sadness rating (5 levels)	1	305	7.89	7,605.00	<.01	.16

About two-thirds (65%) of the SLD group completed less than a high school education, compared to 84% of the non-SLD group,  $M^2(1, 304) = 8.6$ ,  $U = 7,591.5$ ,  $p < .01$ ,  $r = .17$ . The SLD group most frequently finished the 12th grade or further education and the non-SLD most frequently finished 10th grade. AE participants who have completed high school must have sufficiently low reading, writing, or math scores to participate in AEFLA programs. No significant difference existed in mothers' high school completion or post-secondary education, which can be a predictor of high school dropout status (Ensminger & Slusarcick, 1992).

Eighty-four percent of the SLD group reported difficulty reading as a child, and 75% received remedial help or participated in special reading classes in school. Whether the 25% of participants reporting SLD who did not receive special help stems from a perception of having SLD without actually having it, or because diagnosis or special services were unavailable, is unknown. Alternatively, their SLDs may have been evidenced in some other area than reading (e.g., math calculations, math problem solving, oral or written expression, listening comprehension). In contrast, only 46% of the non-SLD reported trouble reading as a child and 25% reported receiving remedial help or participating in special reading classes. Difficulty reading as a child was significantly more prevalent for participants reporting SLD,  $\chi^2(1, 291) = 35.5$ ,  $p < .001$ , OR = 6.1. A 95th percentile confidence interval (CI<sub>95</sub>) indicates the odds of participants with SLD experiencing reading difficulty as a child versus not experiencing it could

be from three to as much as eleven times higher than the odds for participants without SLD. Receiving remedial help or participating in special reading classes was significantly more likely for participants reporting SLD,  $\chi^2 (1, 302) = 65.9, p < .001$ , OR = 9.1, with odds between five and sixteen times as high (CI<sub>95</sub>).

### *Life experience*

The groups were comparable in marital status, household income, and urban status. Participants with SLD were slightly more likely never to have married (62%) than participants not reporting SLD (51%), but the difference lacked significance. Many participants with SLD (50%) and without SLD (35%) lived in households earning less than \$10,000. Individuals in both groups most often lived in an urban area and participated in an urban adult education program (84% of SLD group and 80% of non-SLD group).

Employment experiences were similar in many ways between groups, differing only in the industries in which participants worked. Sixty-eight percent of the SLD group were employed—38% by a single employer and 30% by multiple employers—compared to 74% of the non-SLD group. Of those employed in each group, about half of participants with SLD and two-thirds of participants without SLD worked more than 41 hours per week. Approximately half (48%) of the employed participants reporting SLD worked in a service industry, 22% performed some form of manual labor, 20% worked in business or another office setting, and 10% worked in human services. Similarly, about 43% of employed participants without SLD worked in a service industry, but unlike the SLD group, 27% worked in business or another office setting, 18% in manual labor, and 12% in human services.

Significant differences exist in how the groups perceive limitations in job opportunities due to skill deficiencies. Roughly half of the SLD group perceived that their academic skills in at least one subject area limited opportunities for employment. Fifty-seven percent believed their job opportunities were limited because of their reading skills, 54% because of their computer skills, 51% because of their writing skills, and 49% because of their math skills. The non-SLD had fewer concerns about employment being limited by their reading and writing skills, and their concerns tended to be slightly stronger relevant to computer and math skills. Forty-four percent believed their job opportunities were limited because of computer skills, 41% because of math skills, 31% because of reading skills, and 30% because of writing skills. Perceived limitations in job opportunities because of reading skills were significantly more likely for participants reporting SLD,  $\chi^2 (1, 299) = 17.8, p < .001$ , OR = 3.0, with odds of limitations from reading versus no limitations from reading from two to five times as high as for non-SLD adults (CI<sub>95</sub>). Participants with SLD believed their writing skills significantly limited job opportunities,  $\chi^2 (1, 301) = 11.8, p = .001$ , OR = 2.4, with odds between one and a half and four times as high (CI<sub>95</sub>). Groups did not differ significantly in their perceptions of job opportunity limitations due to math skills or computer skills.

The SLD group perceived themselves as generally healthy: 75% rated their overall health as good to excellent, and the same percent had visited a primary care provider (PCP) in the past year. About half had visited a dentist, and 39% had visited an emergency room (ER) in the past year. The non-SLD group believed themselves to be healthy, too: 83% rated their health as good

to excellent, and in the past year 65% had visited a PCP, about half visited a dentist, 32% visited an ER. Twenty percent of the SLD group had received counseling or treatment for substance abuse compared to 14% of the non-SLD group. No significant difference between groups existed in likelihood of PCP, dentist, or ER visitations, or the incidence of substance abuse counseling or treatment.

Thirty-four percent of the SLD group reported having vision difficulties, 9% reported difficulties hearing, 24% reported other impairments or disabilities. Among the non-SLD group 19% had difficulty seeing, 13% had difficulty hearing, and 17% reported other impairments or disabilities. Vision difficulties were significantly more prevalent in participants reporting SLD,  $\chi^2(1, 304) = 8.0, p < .01$ , OR = 2.2, with odds between slightly higher (1.27) to four times as high (CI<sub>95</sub>), yet hearing difficulties and other health problems or impairments were not significantly different.

Of the SLD group, 60% perceived themselves as satisfied or extremely satisfied with life in the past 12 months, in significant contrast to 70% of the non-SLD group,  $M^2(1, 305) = 4.6, U = 8,302.0, p < .05, r = .12$ . Approximately half (52%) of the SLD group felt downhearted and blue some or almost all of the time in significant contrast to 37% for the non-SLD group,  $M^2(1, 305) = 7.9, U = 7,605.0, p < .01, r = .16$ . Sadness and satisfaction ratings cross-tabulated with SLD status revealed only one-third of participants with SLD were not at all or just a little downhearted or blue and at the same time were satisfied or extremely satisfied with life, compared to about half of adults without SLD. Learners with SLD who reported being less satisfied with life and more blue were most frequently very young or middle-aged males, had low reading levels and a childhood history of reading difficulties, and reported fair health. Ninety percent of the SLD group had someone in whom they could confide for emotional support, which was about the same as for those without SLD (91%).

### *Regression Analysis*

We performed a post-hoc regression analysis because of the significant differences we observed in age and IQ. The analysis included data from only 283 adults for whom we had WAIS pro-rated IQ and CASAS Reading raw scores. The mean CASAS Reading raw score was 18.9 ( $SD = 7.7$ ), which represents a standard score of 229 and reading Level 4. The average WAIS pro-rated IQ score was 80.1 ( $SD = 11.5$ ). Participants averaged about 26 years of age, and 30% reported diagnosis of SLD. After controlling for the effects of IQ and age, SLD status added a statistically significant yet small effect,  $F(3, 279) = 75.1, p < .001$ , adjusted  $R^2 = .44$ . IQ (as transformed) alone accounted for the largest proportion of variability in CASAS Reading raw scores, adjusted  $R^2 = .42$ .

In the regression equation predicting CASAS Reading raw scores, adults could expect reading score gain with increasing IQ scores, and reading score loss with increasing age or with diagnosis of SLD. For adults of approximately the same age and IQ who differed by SLD status, the adult with SLD would likely have a slightly lower reading score. For example, the model predicted an 18-year-old Level 2 participant without SLD and an IQ of 82 would have a CASAS Reading raw score of 21 (compared maximum score of 39). For another Level 2 participant, age 21 with SLD and an IQ of 86, the model would predict a CASAS Reading raw score of 20—one

point lower than the similar individual without SLD. Similarly at Level 5, a 19-year-old participant without SLD and an IQ of 104, would have a predicted reading score of 28. The model would predict for this participant's Level 5 counterpart with SLD, age 20 and IQ of 112, a reading score of 27. Even as the differences are not dramatic, on average predicted CASAS Reading raw scores would be less for adults reporting SLD than for those without SLD at all six reading levels.

*Limitation.* These results may be limited by the nature of self-reporting a SLD diagnosis. Participants not reporting SLD may have received special help for reasons other than SLD, or perhaps opted not to disclose their history of receiving SLD services. The literature describes a tendency of some adults diagnosed with SLD as children to no longer identify themselves as having SLD (Gerber & Price, 2003). Conversely, some adults who received extra assistance in school (e.g., tutoring) may think they have diagnosed SLD when they do not. We believe, on the basis of validity checks accompanying all procedures, the participants in this study were candid in answering our question about their SLD status and reported to the best of their knowledge. Our most significant concern was our lack of access to the participants' diagnostic evaluations in which their disability status was determined. We doubt that uniform operational procedures and criteria were applied in SLD determination, which is also a significant issue in school identified disability populations.

## Discussion

Adult education learners with SLD superficially appear to be very much like other AE learners in our sample. They exhibited no significant differences in home, family, employment, economic well-being, or utilization of medical care. Only one significant difference existed in terms of their health: SLD learners are slightly more to four times more likely to have vision difficulties, which frequently may be correctable with glasses. The significant differences between SLD and non-SLD learners are more subtle, emerging in terms of school experiences, reading abilities, age, placement in adult education, and perceptions and emotions.

*School experiences.* Given the popular understanding of SLD as a reading disability, we were not surprised by the finding that adults at one time receiving diagnoses of SLD were six times more likely to report having difficulties reading as a child. Likewise, they were nine times more likely to have participated in remedial or special programs. Special education support and transition assistance or courtesy diplomas may be reasons why more AE learners with SLD completed high school. However, the value of such credentials is suspect if these individuals still qualify for participation in AEFLA programs by virtue of their low reading, writing, or math abilities.

Adult learners who identify themselves as both having SLD and a high school diploma are likely to need direct and explicit instruction in basic literacy skills (e.g., *Wilson Reading System*<sup>®</sup> [Wilson, 2002], *Lindamood Phoneme Sequencing Program* [Lindamood & Lindamood, 1998]). For those learners with SLD and no high school diploma it is hard to know, based on these characteristics, whether they need specialized literacy instruction or are advanced enough for GED preparation.

*Reading abilities.* The SLD group in our study averaged significantly lower scores in reading comprehension, functional reading skills, and general intelligence than the non-SLD group. Adult education participants with SLD are likely to score 10% to 25% lower on a measure of reading comprehension than participants without SLD. Similarly, they are likely to score 15% to 30% lower on a functional reading skills assessment. The differential, while significant, is far less for a measure of general intelligence between SLD and non-SLD. The learners with SLD are likely to score less than 1% to 7% lower.

By definition, SLD does not equate to lower intelligence, but does imply the need for differentiated instruction compared to others at the same reading level. For example, adult learners with SLD may have a sufficiently large vocabulary and prior knowledge base to handle more difficult texts than other learners with the same reading levels. Meanwhile, they may benefit from concentrated instruction addressing a specific cognitive processing deficit (e.g., executive functioning, working memory, phonemic awareness) that learners without SLD would not require. Adult literacy and GED preparation programs are often not equipped to assess such deficits and may need to have staff participate in professional development that can benefit adults with cognitive processing challenges or seek the assistance of other professionals.

*Age and placement in AE.* About half of both the SLD and non-SLD groups in our study were between 16 and 25 years of age, consistent with the finding that many high school dropouts earn a diploma or GED credential within eight years of the date they normally would have graduated high school (Bektold, Geis, & Kaufman, 1998; Hurst, Kelly, & Princiotta, 2004). However, proportionately more adult learners with SLD than without SLD fell in the middle age category (over 45 years). We do not know if this subgroup of older learners with SLD had been participating in AE longer or simply started participating in AE later in life. This finding concerning age may also reflect Gerber's (1998) assertion that adults with SLD differed "depending on the phase of adulthood" (p. 10) they experienced, whether early, middle, or late adulthood. Abilities of adults with SLD may decline with age (Gerber, 1998). We suspect the instructional needs of learners with SLD in middle age may differ from the instructional needs of younger, more recent participants in the educational system. For example, this older adult population may need more explicit support in the development of study skills and test taking since they are less likely to have recently practiced these skills. Another area in which these older adults might need assistance is computer literacy (e.g., accessing information through the Internet and electronic retrieval sources).

Individuals with SLD entering adult education tend to start their studies one level lower than learners without SLD due to lower reading levels. Typical instruction provided for an adult with low literacy may not take into account the relatively higher intelligence nor the cognitive processing differences associated with SLD, and thus, move too slowly or in a manner not helpful to learners with SLD. Our post-hoc analysis of reading level controlling for age and intelligence confirms that SLD status contributes significantly to the reading level of adult learners.

*Perceptions and emotions.* Lastly, significant differences exist in the perceptions of the limitations faced in employment because of reading and writing skill deficits between the SLD and non-SLD groups. Although both groups were most frequently employed in service



industries, the second most often occurring industry in which SLD group was employed was manual labor, and for the non-SLD group was in business or other office settings. Some adult learners with SLD may perceive that skill limitations in reading and writing prevent them from obtaining employment requiring more academically-oriented skills than manual labor or service work. As AE program staff and participants with SLD work together to identify employment goals, staff needs to check with participants on their perceptions of limitations and confirm whether unrealistic views of limitations might prevent learners from pursuing employment opportunities that truly are within reach.

The SLD group tended to be significantly less satisfied with life and more depressed than the non-SLD group despite being equally likely to have the support of a confidant. The demographic characteristics of adults with SLD who were less satisfied and more depressed suggest a potential frustration resulting from experiencing fair health and lifelong struggles with reading. This frustration may have a greater affect on young males approaching adulthood with low literacy skills, as well as middle-aged men who have coped with low skill levels for decades. An awareness of these characteristics may be helpful as staff plans for instructional services.

### *Individual differences*

Factors that distinguish groups, of course, are not always representative of all individuals in a given group. In fact, special educators are well aware of the importance of individual differences when planning for instruction in K-12 settings. From these findings we conclude that the categorical label of SLD may give clues, but does not provide enough information for adult literacy educators to determine instructional needs. Rather, adult educators, like educators in other settings, need to make case-by-case decisions in which a knowledge of SLD characteristics may be helpful. From the data collected in our study we provide the following two profiles of individuals whose SLD statuses may indicate the need for differentiated instruction.

*Level 2 learner with SLD.* Amy is a 21-year-old, single mother of two pre-school aged children, with an IQ of 86. She lives in an urban community and has an annual household income between \$7,500 and \$9,999. Despite her SLD, she finished high school and holds a 30-hour per week job in packaging and production for an area newspaper. Amy participated in special classes for reading and learning during school, and can understand and speak English very well. In spite of this, she relies on family and friends to help her fill out forms, read information, and write her correspondence.

The local adult literacy program provides Amy an opportunity to improve her reading and writing skills so that she can meet her current job requirements, get a better job, and possibly participate in postsecondary education. Amy also wants to improve her reading so she can begin to help her children with their homework, and "for herself." Amy scored a 206 on the CASAS reading functional assessment, and so entered the literacy program at a Level 2. Her WRMT-R PC score of 22 equates to 2nd grade level reading.

Amy believes if she works hard she can improve her reading, and has indicated a willingness to do so. She demonstrates normal listening comprehension and verbal skills, and has an estimated IQ score in the low-normal range corresponding to the 18th percentile.

Nevertheless, she completed all the requirements for high school without achieving sufficient reading and writing skills to independently function and meet her life goals. These facts combined with Amy's self-reported SLD should prompt her literacy instructor to consider whether Amy may need something other than the typical AE instruction based on functional literacy level.

*Level 6 learner with SLD.* Raith is a 23-year-old, male with an IQ of 118 (88th percentile equivalency), who works 30 hours per week in a pizza delivery job. He lives at home with his parents and one young sibling in an affluent suburban area. Raith was told in school that he had SLD, but he does not remember participating in any special reading classes and does not recall having trouble reading or learning. Nevertheless, Raith dropped out of high school after the 10th grade, which may have been related to his history of substance abuse. He says that his health is "very good", but he also worries about his health and has visited his primary care physician 20 times in the past year despite having no apparent physical disability or chronic illness.

Raith indicated the reasons he enrolled in adult education at a local community college were to: earn a GED, prepare for post-secondary education, and get a better job. His passage comprehension score on WRMT-R PC was the equivalent of college-level reading, a 60 compared to a maximum possible score of 68. He scored 247 on a CASAS reading functional assessment, placing him one point above the threshold for Level 6 High Adult Secondary Education, which is primarily a GED preparation program. He believed both that he read "very well" and that his reading, writing, math, and computer skills limited his ability to get a better job. He agreed with the statement that if he worked hard his reading skills would improve.

The apparent contradictions in Raith's assessment scores and self-reported characteristics and perceptions hint at some of his needs during his AE experience. He has above average IQ, but did not complete high school; he says he has SLD but never received services while attending school in an affluent community where services were readily available. He says he is very healthy and yet he worries about his health and visits his primary care physician nearly twice a month, which is highly unusual for a healthy young person. An instructor encountering Raith may not need to be concerned about an alternative curriculum to address his SLD. Rather Raith may need emotional and behavioral support during his pursuit of a GED.

### Conclusion

Lessons learned by K-12 special educators also apply in adult education. Low literacy adult learners may need different instruction than typically provided to other adult learners. However, instructional decisions need to be made on a case-by-case basis. The significantly different characteristics displayed by the learners with SLD in our study (e.g., prior participation in special education; having both an SLD diagnosis and a high school diploma; low reading scores; middle aged; negative perceptions about limitations due to reading abilities) may be signposts pointing to the need for further evaluation of a learner's academic needs, but do not provide enough information for planning the instruction. We suggest that a more comprehensive assessment profile of academic skills and abilities can be helpful to instructors and the programs' participants. For those learners with SLD, a diagnostic or clinical teaching approach is

recommended that focuses on very specific skills and considerations of the cognitive processes associated with SLD (e.g., phonemic awareness, memory, and executive functioning).

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